

Volume 5

1963-1964

SH  
11  
A13  
A4  
V.5

STATE OF ALASKA

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1963 - 1964

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-5

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME

Walter Kirkness, Commissioner

E. S. Marvich, Deputy Commissioner

Alex H. McRea, Director

Alaska, Sport Fish Division

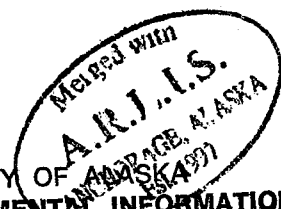
Louis S. Bandirola, Coordinator

3 3755 000 85612 0

**ARLIS**

Alaska Resources  
Library & Information Services  
Anchorage, Alaska

UNIVERSITY OF ALASKA  
ARCTIC ENVIRONMENTAL INFORMATION  
AND DATA CENTER  
707 A STREET  
ANCHORAGE, ALASKA 99501



## INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-5, "Sport Fish Investigations of Alaska."

The project is composed of 25 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. Of these, eight jobs are designed to continue the cataloging and inventory of the numerous State waters in an attempt to prepare an index of the recreational waters. Four jobs are designed for specific sport fishery creel census while the remainder of the jobs are more specific in nature. These include independent studies on king salmon, silver salmon, grayling, Dolly Varden, a statewide access evaluation program, egg take program and a residual toxaphene study. The information gathered from the combined studies will provide the necessary background data for a better understanding of local management problems and assist in the development of future investigational studies.

The subject matter contained within these reports is often fragmentary in nature. The findings may not be conclusive and the interpretations contained therein are subject to re-evaluation as the work progresses.

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations of Alaska.

Project No: F-5-R-5 Title: Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and Upper Susitna River Drainage.

Job No: 11-A

Period Covered: May 1, 1963 - April 1, 1964.

Abstract:

The position of Sport Fish Biologist for the Copper River Drainage was vacant from April until July, 1964. A major portion of effort during this report period was devoted to becoming familiar with the area.

Eight lakes were test netted during the fall of 1963. Three of these were checked to evaluate the success of hatchery plants. The remainder were investigated for trends in fish populations and the availability of certain species for possible egg-taking operations.

Creel census data, from military recreational camps at Lake Louise, were analysed and compared with past data.

Fish wheels on the Copper River were checked periodically for species composition of the catch. Subsistence catch records were analysed and compared to data collected in 1961 and 1962.

A program of winter oxygen determinations was initiated in lakes located adjacent to the Glenn and Richardson Highways.

Aerial surveys were made to obtain information on salmon spawning areas, including numbers of fish, species, and timing of maximum concentrations.

Recommendations:

It is recommended that:

All artificial plants of fish in the Copper River Drainage be checked closely to determine their success. Special reference should be given rainbow and silver salmon which appear to be doing well and are popular with the anglers.

Continued efforts be directed toward location and establishment of permanent egg taking stations for grayling and lake trout.

Additional winter chemistry be carried out in an effort to establish minimum oxygen requirements for grayling, silver salmon and rainbow.

Angling for burbot be popularized in an effort to increase the harvest of this excellent food fish.

An intensive survey be made of the Gulkana River System to determine the permanent fisheries that exist and the extent of king salmon and steelhead runs.

The upper tributaries of the Tonsina and Klutina Rivers be investigated thoroughly to determine the extent of the king salmon spawning migration.

Inventory and cataloging of lakes in this area be continued and the scope of this program widened to include some of the more popular fly-in waters.

Objectives:

To investigate those fisheries which have potential as egg taking sites for trout, char and grayling.

To complete the inventory and cataloging of lakes and streams in this area, especially those adjacent to the Alaska Highway System.

To evaluate the present and potential use of fishing waters in this area.

To determine trends of fish populations in the more exploited waters and formulate management plans for these fisheries.

To maintain a check on the harvest of fish by fish wheels, dip nets and other forms of subsistence fishing gear.

#### Techniques Used:

The Copper River Drainage comprises a large number of lakes and streams which support, or have the potential for, sport fish populations. Unfortunately many of these waters are considerable distance from the road system and not readily available to the average angler.

In keeping with the philosophy of providing angling for the largest number of fishermen, the emphasis of effort has been on those waters adjacent to access roads. Projects F-5-R-2, F-5-R-3 and F-5-R-4 have been largely an inventory and cataloging of these lakes and streams. There are still many waters which must be surveyed and cataloged. In addition, efforts are being made to establish areas for egg taking operations for trout, char and grayling.

The sport fishery in the Copper River Drainage consists primarily of grayling Thymallus arcticus (Cope), lake trout, Salvelinus namaycush (Walbaum), and rainbow trout, Salmo gairdneri (Richardson). Some experimental plants of silver salmon, Oncorhynchus kisutch (Walbaum) have been made with success. The Dolly Varden, Salvelinus malma (Walbaum) is also present in many of the waters in this area.

One hundred twenty-five foot gill nets with five stretch mesh sizes ranging from one inch to three and one-half inch were used to sample fish populations. These nets were all six foot deep and rigged to dive. With only

a few exceptions, all nets were set from the shoreline out.

Back pack equipment was used on the lakes close to a road while airplane transportation was utilized to reach the waters inaccessible by foot.

Fish wheels along the Copper River System were checked at intervals to become familiar with their location, operation and species of salmon being taken.

Aerial counts were made at regular intervals to determine numbers and times of salmon spawning. Flights were made only on days when good visibility was possible. Counts were made on those streams which had been checked in previous years in order to have comparative data. Winter oxygen determinations were accomplished with the use of a Hach Colorimeter. An ice auger was employed to penetrate the ice cover.

Temperatures and depths were taken with battery-powered electronic gear.

#### Findings:

Due to the absence of a sport fish biologist in the Copper River Area from April until July, and the lack of knowledge of the area on the part of the new biologist, the cataloging and inventory of sport fish and sport fish waters progressed quite slowly during the 1963 - 1964 segment. The majority of time was spent in orientation and familiarization of the area.

There is a definite need in Alaska, and other states, for lake trout eggs. Because this fish is prevalent in the area, it is not impossible to assume that egg taking stations can be established. Limited gill netting was done in Lake Louise with this in mind. Preliminary results showed a definite potential exists in this lake for artificial spawning operations. Thirty-three lake trout were taken in five gill nets set over possible spawning areas. Twenty-seven of these fish were mature of which 13 were females. The mature lake trout ranged from 18.0 inches to 36.0 inches fork length and averaged 24.8 inches. The condition of the

various females examined indicated that the spawning period is probably from September 10 through September 25. This, however, is based on a relatively small sample and conditions may vary considerably from year to year.

A review of the "Preliminary Lake Survey of Lake Louise and Little Lake Louise" by Roger W. Allin (U. S. Fish and Wildlife Service, 1956) indicated that most of the east shoreline and a large part of the west side of Lake Louise has the type of bottom suitable for lake trout spawning. This survey was conducted during July and August and no data on spawning activity were collected.

Tables 1 and 2 are analyses of creel census data collected from Lake Louise Military Recreation Camps located at the lake. This creel census data shows that grayling comprised almost one-half the total sport fish catch. This apparent density of grayling is not substantiated by the 1956 and 1963 test gill netting because grayling do not gill net readily in clear water. A total of 61 overnight gill net sets were made during those 2 years and the total grayling catch amounted to only 2. A creel census program conducted in conjunction with the 1956 lake survey listed only ten grayling and whitefish taken by anglers. It is the opinion of this writer that the anglers took most of the 1963 grayling catch from small inlet streams and other lakes adjacent to Lake Louise.

A comparison catch data during 1956 and 1963 (Table 3) reveals some interesting data. The catch per hour of lake trout was identical both years. The major differences are in the numbers of anglers, harvest and hours fished per angler. The first two differences are readily understandable. The decrease in angler-hours is probably due to a change in the type of "average" angler now utilizing our waters. Time spent on the lakes is not devoted entirely to angling, but also with boating, water skiing and other recreational interests.

The most significant factor about this comparative data is that in spite of a more than 100 per cent increase in fishing pressure, the catch rate has not changed. Because of its large size, 37 square miles, the annual harvest of sport fish from Lake Louise is still considerably short of its annual production.

Table 1. 1963 Lake Louise Creel Census from Military Recreational Camps.

Month	Total Anglers	Total Hours	Catch Per Hour	Fish Per Angler	Hours Per Angler	% of Anglers Unsuccess- ful	Hours Per Success- ful Anglers	Hours Per Unsuc- cessful Anglers	Successful Anglers. Catch Per Hour	Successful Anglers. Fish Per Angler
May	3	8	.38	1	2.7	0	2.7	0	.38	1.00
June	523	1621	.32	1	3.1	54	3.3	2.8	.66	2.20
July	624	1900	.27	.81	3.0	54	2.5	3.5	.69	1.75
August	337	1113	.20	.66	3.3	81	3.4	3.2	1.05	3.60
Sept.	2	5	.60	1.5	2.5	0	2.5	0	.60	1.50
SEASON	1489	4647	.27	.87	3.1	60	2.9	3.2	.72	2.11



Table 2. 1963 Lake Louise Creel Census from Military Recreational Camps.

Composition of Catch								
Month	Total Fish	Lake Trout	Grayling	White Fish	Ling Cod	Per Cent of Lake Trout	Per Cent Grayling	Per Cent Whitefish
May	3	2	1	0	0	66.6	33.4	00.0
June	523	304	208	10	1	58.0	40.0	2.0
July	507	248	224	34	1	49.0	44.0	7.0
August	223	54	165	4	0	24.0	74.0	2.0
Sept.	3	1	2	0	0	33.4	66.6	00.0
SEASON	1259	609	600	48	2	48.3	47.7	4.0

Table 3. Lake Louise Creel Census - Comparison of 1956 and  
1963 Data

ALL FISHERMEN	1956	1963
Total Anglers	695	1489
Total Hours	3939	4647
Total Fish *	540	1259
Total Lake Trout	530	609
Catch Per Hour	.14	.27
Hours Per Angler	5.7	3.1
Lake Trout Catch Per Hour	.13	.13
SUCCESSFUL FISHERMEN		
Total Anglers	284	595
Total Hours	1684	1747
Catch Per Hour	.32	.60
Lake Trout Catch Per Hour	.31	.35
Hours Per Angler	6.0	2.50

\* This includes Lake Trout, Grayling, Whitefish and Burbot.

Tolsona Lake (mile 170, Glenn Highway) was gill netted (Table 4) to check the success of a silver salmon plant made in July, 1962. The largest silver salmon taken measured 12.0 inches, fork length. Silver salmon were stocked in adjoining Moose Lake at the same time. No gill netting was done on this lake, but creel checks revealed that silver salmon up to 14.5 inches, fork length, were being taken by anglers.

Bear Cub Lake (mile 78, Tok Highway) was again gill netted as part of a pre-rehabilitation study. Results of this and past netting definitely confirm the need for chemical treatment. As soon as public access problems are resolved, rehabilitation will be undertaken.

Hanagita Lake, and its outlet, Hanagita Creek, were checked in September for a steelhead trout spawning concentration. At this time, September 12 to 14, there were approximately 35 steelhead trout in the creek within one-half mile downstream. Twenty of these fish were taken by hook and line, measured and released. The fish ranged from 22.3 inches to 30.0 inches, fork length. The average fork length was 27.4 inches. Thirteen of the fish were females, of which one was barren. All of the other female and male steelhead trout were mature and appeared to be very close to the actual spawning period. Only one steelhead, a ripe male, was taken from the lake, in three overnight gill net sets.

No steelhead were observed in the inlet above Hanagita Lake. From interviews with two persons who have visited the steelhead run for the last four years, it is apparent that large numbers of these fish have not been observed. These steelhead are quite vulnerable to the angler since the stream is small and easily fished. From the condition of the steelhead examined, it is believed that they spawn in late September or early October.

Three overnight gill net sets were made in Robe Lake during late September for a population check and to investigate the possibilities of a Dolly Varden spawning run.

Table 4.

## TEST NETTING SUMMARIES, 1963

NAME	NUMBER OF FISH	SPECIES	LENGTH RANGE	LENGTH MEAN	FREQUENCY <u>1/</u>	COMPOSITION %
Tolsona Lake	20	GR.	7.1 - 13.5	9.9	.55	83.5
	4	SS.	9.2 - 12.0	10.6	.11	16.5
Bear Cub	18	LNS.	6.9 - 15.4	9.6	.50	78.0
Lake	2	WF.	6.9 - 12.0	9.4	.06	9.0
	3	Burbot	7.6 - 8.5	8.2	.08	13.0
Long Lake	112	LNS.	6.5 - 18.5	11.5	3.00	74.0
	31	RS.	22.0 - 26.0	24.0	.81	20.0
	3	DV.	8.3 - 20.0	12.3	.08	2.0
	3	SS.	8.7 - 12.9	10.1	.08	2.0
	3	GR.	6.9 - 8.2	7.7	.08	2.0
Hanagita	56	WF.	7.0 - 15.3	11.0	1.80	73.0
Lake	18	LT.	12.9 - 26.5	16.1	.56	23.0
	2	GR.	12.5 - 13.5	13.0	.06	2.6
	1	SH.		26.5	.03	1.4
Robe Lake	56	DV.	5.0 - 19.6	11.2	1.05	47.0
	62	RS.			1.17	53.0

Table 4. (Con't) Test Netting Summaries, 1963

NAME	NUMBER OF FISH	SPECIES	LENGTH RANGE	LENGTH MEAN	FREQUENCY 1/	COMPOSITION %
Lake Louise	227	WF.	6.7 - 17.0	12.1	2.36	81
	33	LT.	15.1 - 36.0	23.3	.34	12
	19	LNS.	8.9 - 18.9	13.8	.20	7
	1	GR.		13.2	.01	
June Lake	13	WF.	10.0 - 13.5	8.9	.65	76.3
	1	GR.		9.3	.05	6.0
	2	LNS.		16.5	.10	11.7
	1	SS.		12.8	.05	6.0
Nita Lake	10	WF.	7.0 - 13.2	9.8	.50	52.6
	3	LNS.	11.0 - 15.0	13.0	.15	15.8
	3	BURBOT	8.2 - 12.0	10.2	.15	15.8
	1	SS.	10.2 - 11.0	10.6	.10	10.5
	1	GR.		10.0	.05	5.3

1/ No. of fish per hour in 125 foot experimental gill net.

GR.	Grayling	LT.	Lake Trout
WF.	Whitefish	DV.	Dolly Varden
RS.	Red Salmon	SS.	Silver Salmon
SH.	Steelhead	LNS.	Long Nose Sucker

A total of 56 Dolly Varden and 62 red salmon was taken. Fourteen of the Dolly Varden were mature and in spawning condition. The Dolly Varden ranged in fork length from 5.0 inches to 19.6 inches and averaged 11.2 inches long. No definite concentration of spawning Dolly Varden was located, but an interview with a local Valdez man sometime later revealed that a large number of these fish were concentrated at the outlet about October 15.

Steelhead trout were stocked in Robe Lake in 1956, 1958 and 1959 but there has never been any evidence that the stocks were successful. In view of the number of Dolly Varden which inhabit the lake, and the large numbers of salmon which utilize it, it is doubtful if another species of sport fish could be successfully established.

June and Nita Lakes (mile 166, Richardson Highway) were checked to determine the survival of silver salmon plants made in 1961. Only one net was set in each lake. Two silver salmon were taken. The largest was 12.8 inches in fork length. These lakes were connected by less than 100 feet of stream and fish movement between the two is not difficult. Additional checks are planned to determine the progress of these silver salmon and the survival of rainbow trout stocked in 1962.

### Subsistence Fishery

Subsistence fishing pressure on the Upper Copper River continued to increase in 1963. A total of 624 permits was issued, as compared to 448 in 1962 and 321 in 1961. See Table 5. The total number of fish taken by actual return counts decreased slightly in 1963. However, only 55 per cent of the catch records were returned as compared to 94 per cent in 1962. The average number of fish per returned permit was only slightly higher than in 1962.

The number of fish wheels operating in this area increased again in 1963 to 43. This is more than twice the number that were operating in 1961. Some fish wheel operators complained that the catch was low again because of too many other wheels and high water during July and August. The latter is the same reason given for low catches in 1962. This opinion was expressed by many long

Table 5. Catch from Salmon Subsistence Permits Issued for the Upper Copper River  
in 1961, 1962 and 1963.

Species	Actual Number Taken (Returns)			Calculated Number Taken (Pro-rated)			Average Number Per Returned Permit		
	1961	1962	1963	1961	1962	1963	1961	1962	1963
Reds	14,977	14,956	14,078	24,075	15,948	25,596	75.00	35.00	41.00
Kings	393	859	464	632	896	844	1.97	2.05	1.34
Silver	367	337	558	591	358	1,014	1.84	.80	1.62
Chum	131	50	48	212	54	87	.66	.12	.11
Pinks	123	71	52	199	76	95	.62	.17	.15
TOTAL	15,991	16,273	15,200	25,709	17,332	27,636	80.09	38.74	44.22

	1961	1962	1963
Total Number of Permits Issued	321	448	624
Total Number of Returns Received	200 or 62 %	420 or 94%	344 or 55%
Average Number of Salmon Taken	80.09	38.74	44.2

Table 6. Winter Oxygen Determinations from Waters in the Copper River Drainage.

Date	Lake	Location	Depth of Sample	PPM Oxygen	Max. Depth of Lake	Fish Present	Ice
12/12/63	Junction	Mi. 160 Glenn Hwy.	10 ft.	6.0	19 ft.	None	30 inches
2/13/64	Junction	Mi. 160 Glenn Hwy.	5 ft.	6.0	19 ft.	None	32 inches
12/12/63	Tolsona	Mi. 170 Glenn Hwy.	8 ft.	6.5	14 ft.	GR. SS.	32 inches
2/21/64	Tolsona	Mi. 170 Glenn Hwy.	7 ft.	3.5	14 ft.	GR. SS.	36 inches
1/30/64	Paxson	Mi. 180 Rich. Hwy.	15 ft.	7.7		GR. LT.	42 inches
1/30/64	Paxson	Mi. 180 Rich. Hwy.	30 ft.	6.4		GR. LT.	42 inches
2/3/64	Gulkana ox-bow	Mi. 129.3 R. Hwy.	13.5 ft.	0		None	36 inches
2/3/64	Mi. 129	Mi. 129 Rich. Hwy.	5 ft.	0		None	36 inches
2/7/64	Dick	Mi. 173 Rich. Hwy.	5 ft.	8.3	32 ft.	GR. RB.	35 inches
2/7/64	Mi. 151	Mi. 151 Rich. Hwy.	11 ft.	0		None	34 inches
2/18/64	Pippin	Mi. 83 Rich. Hwy.	7 ft.	2.75	14 ft.	GR.	39 inches
2/18/64	Kenny	Mi. 12 Edgerton	6 ft.	.80	10 ft.	None	42 inches



Table 6 (Con't) Winter Oxygen Determinations from Waters in the Copper River Drainage.

Date	Lake	Location	Depth of Sample	PPM Oxygen	Max. Depth of Lake	Fish Present	Ice
2/28/64	Gillespie	Mi. 167 Rich. Hwy.	4 ft.	0.00	8 ft.	GR.	38 inches
2/28/64	Nita	Mi. 166 Rich. Hwy.	8 ft.	6.6	37 ft.	GR. SS. RB.	38 inches
2/28/64	June	Mi. 166 Rich. Hwy.	8 ft.	7.5	20 ft.	GR. SS. RB.	37 inches
2/28/64	Wyoming	Mi. 166 1/2 R. Hwy.	5 ft.	6.5	20 ft.	GR.	37 inches
3/2/64	Moose Lake	Mi. 170 Rich. Hwy.	7 1/2 ft.	6.25	30 ft.	GR. SS.	38 inches
3/2/64	Moose Lake	Mi. 170 Rich. Hwy.	15 ft.	3.5	30 ft.	GR. SS.	38 inches
3/5/64	Hudson Lk.	18 Mi. West of Copper Center	15 ft.	7.0	50 ft.	GR. Burbot	34 inches
3/5/64	Hudson Lk.	18 Mi. West of Copper Center	30 ft.	4.5	50 ft.	GR. Burbot	34 inches

GR. Grayling

SS. Silver Salmon

RB. Rainbow

Fish in lake established from summer sampling only.

time residents of the area and biologists more familiar with the water conditions than the writer. There has been a decided increase in subsistence fishermen from areas outside of the Copper River Basin.

#### Winter Oxygen Determinations

There are many lakes and ponds in this drainage which can be classified as "borderline" as concerns the ability to over winter fish. In order to help determine which of these waters show promise of becoming a fishery, a program of winter oxygen determinations has been started. As can be seen from Table 6, only 15 lakes have been checked thus far. Lakes which are known to over winter fish, as well as those in doubt, are being sampled. It is hoped that by taking a large number of samples some criteria can be developed which will aid materially in determining lakes with ability to support a fishery year-round.

Prepared by:

Approved by:

Fred T. Williams,  
Fishery Biologist

Louis S. Bandirola,  
D-J Coordinator

Date: April 1, 1964

Alex H. McRea, Director  
Sport Fish Division